



## Appendix A

May 2, 2002, Action Memorandum

495630



## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 8

999 18<sup>TH</sup> STREET - SUITE 500  
DENVER, CO 80202-2466

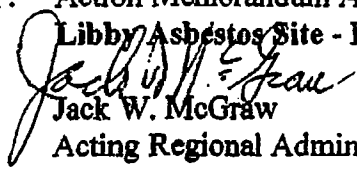
## ADMINISTRATIVE RECORD

MAY - 2 2002

Ref: 8EPR-ER

ACTION MEMORANDUM AMENDMENT

**SUBJECT:** Action Memorandum Amendment for the Time-Critical Removal Action at the  
~~Libby Asbestos Site~~ - Libby, Lincoln County, Montana.

**FROM:**   
Jack W. McGraw  
Acting Regional Administrator

**TO:** Marianne Lamont Horinko  
Assistant Administrator  
Office of Solid Waste and Emergency Response

**THROUGH:** Michael B. Cook, Director   
Office of Emergency and Remedial Response

Site ID#: BC

Category of Removal: Time Critical, Non-NPL, EPA Fund-Lead

**I. INTRODUCTION**

The purpose of this ACTION MEMORANDUM AMENDMENT is to: 1) request and document Headquarters approval of a ceiling increase for the Libby Asbestos Site (Site) in the Libby Valley in Lincoln County, Montana; and 2) modify and expand the scope of the Removal Action described herein. The proposed modification of the scope of the Removal Action would address newly identified exposure pathways and sources of vermiculite contaminated with amphibole asbestos at the Site.

Although the EPA is further investigating a number of scientific and legal issues, there is a clear concern for the health of the citizens of Libby. Therefore, it is proposed that the EPA proceed on all of the cleanup activities planned or underway, according to this Action Memorandum Amendment. This is to include the removal of vermiculite insulation from businesses and residences as necessary to assure the community's health is protected. For this reason, and as a result of the urgency to begin this Removal Action, this Action memorandum Amendment requests that, through your signature, you grant immediate authorization to the Region to proceed with these cleanup activities pending the final resolution of the scientific and legal issues mentioned above.



This Action Memorandum Amendment changes the scope of the Removal Action to address additional sources of amphibole asbestos where significant exposure may still take place. This action is based upon the unique circumstances in Libby, which include not only the level of cumulative exposure and multiple pathways, but also the highly unusual facts indicating that homes in Libby contain insulation that consists of the asbestos-containing vermiculite mined at Libby that was not inspected, packaged, labeled, warranted, regulated or sold as a commercial product.

## II. SITE CONDITIONS AND BACKGROUND

### A. Site Description

#### 1. Removal Site Evaluation

The Action Memorandum dated May 23, 2000 (see Attachment 1) provides the basic description of the mine and processing facilities, and outlines EPA's initial Removal Actions at two industrial locations related to the Site. EPA approved the first Amendment to the Action Memorandum on August 17, 2001 (see Attachment 2), to continue the previous activities and address contamination at new properties.

The amphibole asbestos contamination found in the Libby Valley comes from one or some combination of the following sources:

Source	Description
Vermiculite Mining Wastes	Contaminated tailings and mine overburden. Used as fill material at locations throughout Libby. Samples indicate levels as high as 80% asbestos, with typical values between 3 to 12%.
Vermiculite Ores	Often mixed in garden soil or in bulk piles in yards. Material ranges from trace to 12% asbestos, with typical values between 3 to 8%.
Vermiculite Processing Wastes	Two waste streams from the vermiculite expansion plants: 1) Stoner rock is a grey-white, flaky crusted reject material. Handling can easily generate high levels of airborne asbestos fibers. Asbestos levels often reach as high as 35%. 2) Low-grade expanded vermiculite that contains a high percentage of unexpanded material. Some Libby residents have reported using this material on their properties.
Bulk Processing Residuals	Remnant materials around former processing plants and the rail corridor through Libby. Used as fill, or found in bulk piles. Usually similar in appearance and asbestos content to the wastes described above.

Tremolite Rocks	Small rocks to large boulders of amphibole asbestos, often mixed with vermiculite. Asbestos content can be as high as 80% to nearly 100%.
Vermiculite Insulation	Preliminary analysis shows that most of the vermiculite insulation found in homes and buildings in Libby contains amphibole asbestos. This material is potentially friable (i.e., it tends to generate airborne, respirable asbestos fibers), and may be resistant to encapsulation and coating techniques. EPA has concluded that Libby residents are a sensitive population. Asbestos exposures which would present acceptable risks to a healthy population may cause an increase in disease for this highly impacted community.
Amphibole Asbestos Dust	Contaminated dust inside the homes and businesses. EPA has collected 261 settled dust samples from 111 residential and/or business properties. 25% of these properties (13% of the samples collected) identified amphibole asbestos fibers greater than 5 um in length, at levels up to 300 times above the AHERA standard. This contamination is easily re-suspended in the air during routine cleaning activities.
Airborne or Ambient Amphibole Asbestos Fibers	Media reports suggest that the dry milling operation released up to 5000 lbs./day of asbestos during peak production (Seattle Post-Intelligencer, November 1999). Environmental releases likely contribute to contamination throughout the Libby Valley, including asbestos dust found in homes where no obvious source has been identified.

EPA site investigations have identified additional exposure pathways and contaminated properties. In addition to these removal activities, the Agency proposed the Site for inclusion on the NPL on February 26, 2002, at the request of the governor.

EPA studies indicate that the amphibole asbestos in vermiculite source materials may contribute to releases and threatened releases of contamination. Therefore, this Action Memorandum Amendment changes the scope of the Removal Action to address additional sources of amphibole asbestos where past, current or future exposure may take place. This approach is necessary because EPA and ATSDR investigations indicate that people in Libby have been exposed to amphibole asbestos via multiple pathways, and that cumulative exposures likely contribute to the observed asbestos-related health effects. The continued exposure of this population to any single amphibole asbestos release may further impact their health.

## 2. Physical Location/Site Characteristics.

The Libby Asbestos Site and its characteristics are defined in the previous Action Memoranda (Attachments 1 and 2). In general, EPA studies show that the nature of the contaminated areas that require response has shifted from a few large parcels with high volumes

of contamination, to many smaller parcels with smaller amounts of contamination. Hence, the physical descriptions will broadly address the homes and buildings found in the Libby Valley.

Homes and Businesses within the Libby City limits: homes within the City of Libby tend to be older (constructed prior to 1950), smaller (<1500 ft<sup>2</sup>), and on smaller lots (<1/4 acre). There are roughly 600 homes within the city limits. Because of their age, and the harsh winter conditions in this part of Montana, the homes tend to require a higher level of maintenance work than most homes across the country. The homes typically remain tightly shut during the winter season, due to the local climate:

Most of the businesses in the City of Libby are clustered in the downtown area, along California and Mineral Avenues, and along the Highway 2 corridor. The downtown businesses are commonly laid out in adjoining "row house style," and may share a common wall or roof. Most buildings in this corridor are one or two stories. There are some stand-alone buildings, as well as a few out buildings. The majority of these buildings were constructed prior to 1950.

The businesses along the Highway 2 corridor are almost all stand alone properties, with a few strip mall developments. Most of these buildings are of single story construction, and more recently built than the downtown businesses.

There are two large commercial operations within the city limits of Libby. The Burlington-Northern Railroad (BNR) rail yard straddles Highway 37 where it crosses the Kootenai River. BNR investigations identified amphibole asbestos contamination along the tracks in the rail yard, and in the buildings. BNR has begun to address these issues by removing the contaminated source materials from its property.

The other large commercial operation is the Stimson Lumber Mill. The mill currently manufactures plywood and dimension lumber. Prior to 1950, this site housed vermiculite processing operations. In addition, a portion of this property was used as a tree nursery, which used various grades of Libby vermiculite ores in bulk. Several of the buildings on the Mill property also contain varying amounts of vermiculite. The EPA and Stimson are currently investigating the contamination associated with these former operations, and monitoring the exposure of Stimson workers to amphibole asbestos.

### **3. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant.**

The amphibole asbestos discussed in this Action Memorandum Amendment is a hazardous substance as defined by Section 101 of CERCLA. EPA sampling and investigation have identified amphibole asbestos contamination at all of the locations found within the Libby Asbestos Site that are the subject of this and previous Removal Actions. EPA believes that asbestos contamination is tracked into homes from the environment and out of homes into the environment from various sources.

#### 4. NPL status

In January 2002, the Governor of Montana designated the Site as the State's highest priority for cleanup, and requested that as such the Site be included on the NPL per 40 CFR 300.425(c)(2). EPA proposed the Site to the NPL on February 26, 2002.

#### B. Other Actions to Date

##### 1. Previous actions

EPA initiated removal actions at the site in the Spring of 2000 at the Screening and the Export Plants. Later investigations identified several more contaminated properties. EPA initiated removal work on all of these properties, and has addressed over 210,000 yds<sup>3</sup> of amphibole asbestos contaminated soil, and over 35,000 yds<sup>3</sup> of contaminated debris. Sampling investigation work is ongoing, with the high probability of identifying more contaminated properties and potential exposure pathways that will require additional response actions.

The Original Removal Action and subsequent Amendment proposed various actions that have been initiated or completed, and a brief update on EPA's progress in completing those actions is provided below:

Location	Action Description and Status
Export Plant	Grace demolished and disposed of 4 buildings on this property, and removed approximately 16,000 yds <sup>3</sup> of contaminated soil, and 1500 yds <sup>3</sup> of debris from the property. EPA and Grace are working to relocate the business from the remaining building, demolish the building, and complete clean up. Ongoing.
Screening Plant	Five parcels. Naturally occurring layers of asbestos material appear to underlie portions of the Site. Ongoing.
Raintree Nursery and Wise properties	All Raintree parcel structures were demolished. Some asbestos remains four or more feet below ground surface. EPA placed a fabric membrane at the four-foot excavation depth on the north side of the Site to aid soil stability and mark the limits of excavation. Complete.
KDC Bluffs Disposal Areas	EPA excavated and backfilled the three parcels. Sampling indicates low-level surface contamination of a 2-4 acre area which is zoned and planned for residential development. Risk factor evaluation is underway. EPA excavated 30-40% of the contaminated soil from the KDC-Flyway. Ongoing.

Rainy Creek Road	To improve haul road conditions and control elevated airborne asbestos fibers, EPA paved the lower half-mile of the road, built a decontamination station at the transition to the unpaved portion, and instituted active dust suppression. The USFS and Lincoln County have issued a joint temporary road closure, restricting access. EPA is working with the USFS to develop a site specific Memorandum of Understanding to coordinate each Agency's long-term responsibility for the Site. Complete.
Plummer Elementary School	EPA has excavated all contaminated soil, and restored the area for use as a playground. Complete.
Libby High School and Libby Middle School	EPA identified contamination under and around the tracks and bleachers, and in buildings. EPA removed all tailings and wastes, contamination underneath the bleachers and in the buildings. Most work has been completed. Track re-surfacing is planned (Spring 2002.) Ongoing.
Brownlee Property	EPA removed the pile of unexfoliated vermiculite, and all associated amphibole asbestos contamination. Complete.
Seifke Property	EPA cleaned or removed all equipment contaminated with amphibole asbestos, demolished two outbuildings, and cleaned the interior of the main residence. EPA also excavated all contaminated soil and debris, and moved this material to the mine for disposal. Some building reconstruction slated for Summer 2002. Ongoing.
Burris and Calhoun Properties	EPA found tremolite rocks used as garden landscaping borders at both sites. The garden soils contained amphibole asbestos at levels greater than 1%. EPA found significant levels of asbestos fibers in dust in the Calhoun residence. EPA removed all contaminated soils and source materials, and cleaned the interior of the Calhoun residence. Complete.
Johnson, Sanderson, Temple, Struck, Rice, Fuhlendorf, Spencer, and Westfall Properties	EPA found vermiculite wastes and asbestos up to 10% by PLM in yard or garden soils at all these locations. EPA removed any tremolite rocks, and either covered or demarcated major contaminated areas. EPA is characterizing nature and extent of contamination. Ongoing.
Champion Haul Road	EPA found vermiculite ore and/or tailings with asbestos concentrations greater than 1% at the surface, where the road leads from Highway 37 into a residential area. EPA covered these areas with a durable geotextile fabric, while sampling continues. Ongoing.

## 2. Current actions

EPA is continuing its on-site investigations in Libby. These include the traditional nature and extent type sampling (Phase I Sampling Plan, January 4, 2000), and some site specific exposure scenario sampling (Phase II Sampling Plan, March 2001).

Most of the previous removal work is either complete or shut down for the winter. EPA is developing details for the ongoing and new projects.

### C. State, Local and Other Authorities' Roles

The State of Montana, ATSDR, PHS, USGS, USFS, Lincoln County Health Board, Libby School Board, and City of Libby officials have been directly involved in this Removal Action largely in the area of communication with the Libby community, a medical screening program, collection of background data, support, and routine sampling and monitoring.

ATSDR and PHS have cooperated with EPA in on-going exposure investigations in Libby. A second phase of medical screening was begun in August 2001. ATSDR and PHS are also working with local physicians, Lincoln County, and the State Medical Officer to develop an epidemiological case series for Libby asbestos victims. This will focus on identifying the nature, presentation, and progression of the disease endpoints from exposure to amphibole asbestos.

USGS is providing EPA with technical assistance in documenting the mineralogical and morphologic nature of the Libby amphibole asbestos. They are also conducting a remote sensing, infrared spectroscopy analysis of the Libby basin to help identify the presence of surface deposits (man-made/disturbed by human activity, or undisturbed/naturally occurring) of the amphibole asbestos. USGS has also been working with EPA to augment and develop the Agency's analytical techniques.

The USFS is providing assistance at the Site with the road closure for Rainy Creek, traffic control, and fire management. USFS is also working with EPA to establish a long-term plan for USFS-owned or controlled properties that have been impacted by Libby asbestos.

Lincoln County has actively helped to provide assistance on medical screening and evaluations, as well as patient care. The Lincoln County Health Officer continues to play a central role in the dissemination of medical information to all of the parties involved. Arrangements have been made for Lincoln County to take over the ambient air sampling in and around Libby, incorporating this into their already established Clean Air Act program.

Although they have participated in many of the community activities and some of the planning efforts, the State of Montana does not have the needed resources to conduct the site investigations or clean-ups independently. The State has therefore deferred the lead on all Site activities to the EPA. EPA continues to provide information to the State, and continues to seek



State Officials' input on the implementation of Removal Actions.

### III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

#### A. Threats to Public Health or Welfare

1) Exposure to Libby Asbestos: EPA has identified and characterized amphibole asbestos contamination at locations in and around the Libby Valley. A partial list of locations includes former processing plants, schools, yards, gardens and rail sidings. Each of these locations exhibits an actual or potential complete human exposure pathway. EPA also found evidence that asbestos has been tracked out of primary exposure locations, resulting in numerous secondary exposures and health effects.

The weight of evidence demonstrates that the Libby community has a widespread medical problem related to exposure to amphibole asbestos. The ATSDR mortality study in Libby found elevated mortality associated with mesothelioma (a rare type of cancer which is very highly linked with asbestos exposure). The rate of mesothelioma in the area is extremely high, with over 1 case reported per 1000 Libby area population versus an expected rate of no more than 1 case per 1 million in the general population. In Libby, asbestosis occurs approximately 40 to 60 times above the expected incidence. NIOSH evaluated U.S. asbestosis mortality rates by county and found results similar to those reported in the ATSDR mortality study; i.e., the death rate from asbestosis in the Libby area is among the highest in the nation. Studies indicate that as many as 41% of Libby vermiculite workers with a ten year work history have been diagnosed with asbestosis (E.S. Wood, 1977, or E. Lovick, 1969).

EPA believes that chronic exposure to high levels of asbestos has compromised the health of many Libby residents. The health effects of this exposure, such as pleural scarring, are associated with increased risks of asbestos-related cancer and pulmonary impairment, and may diminish the ability to tolerate the effects of further asbestos exposure. Regardless of the mechanism, several studies have demonstrated the relationship between the findings of asbestos-related pleural and interstitial abnormalities, and serious progression of chronic asbestos-related diseases (e.g., Erlich et al., 1992; Shepard, et al., 1997; Cookson, et al., 1986; Viallat, et al., 1983).

The adverse health effects associated with exposure to amphibole asbestos in Libby has been clearly documented by occupational studies of former vermiculite mine and processing workers by researchers from NIOSH and McGill University [Amandus et al. 1987a, 1987b, 1987c; McDonald et al. 1986a, 1986b] which found that these former workers had significantly increased rates of asbestos-related pulmonary abnormalities and disease (asbestosis and lung cancer). Libby physicians describe health conditions consistent with these studies. Thus, EPA has concluded that Libby residents are a sensitive population. Asbestos exposures which would

present acceptable risks to a healthy population may cause an increase in disease for this highly impacted community.

W.R. Grace & Co. instituted a wet-milling operation at the Site, which reduced airborne asbestos releases. Grace then closed the mine and processors, further cutting workplace and widespread ambient exposure pathways. EPA response work has identified and addressed even more exposures that once existed in Libby. However, additional exposure pathways still exist, and Libby residents continue to be diagnosed with asbestos-related conditions. The latency period (ten to thirty years) for manifesting asbestos-related health effects means that the benefits of reducing the cumulative exposures to this community may not become evident for some time.

The effects of these exposures may be aggravated by the prevailing tendency for meteorologic inversions, which trap particulate contaminants in the area, resulting in Libby's historic designation as a non-attainment area for particulates. Libby also has a high rate of smokers. The synergistic relationship between cigarette smoking and asbestos-related illness is well documented, and likely a significant factor in the high disease rates observed in Libby.

EPA and others have demonstrated the friability of the fibers by conducting workplace and recreational exposure sampling scenarios in Libby. Sample results for sweeping, transferring vermiculite between containers, and EPA clean up activities yielded airborne asbestos levels of over 1.0 f/cc. Sampling for recreational exposures have shown exposure levels of 0.2 f/cc on a school track. These levels far exceed the Occupational Safety and Health Administration (OSHA) permissible standard of 0.1 f/cc.

2) Asbestos releases to the environment from contaminated vermiculite sources: EPA has observed that older residences and businesses are most likely to contain contaminated vermiculite insulation in Libby. The age and condition of these structures increase the likelihood of exposure to asbestos. Since Libby has the second lowest per capita income in Montana, many people tend to do repairs themselves, or postpone home repairs. The resulting poor home condition increases the potential to release contaminated vermiculite insulation into the living space. In some Libby homes, vermiculite insulation is literally falling out into the living space from gaps around light fixtures and electrical switches. EPA sampling has detected amphibole asbestos in dust in the interior of approximately 25% of the homes tested in Libby. EPA believes that at least some of this contamination is related to the vermiculite insulation in the homes.

Aside from direct exposures, residents could sweep contaminated material up and throw it in the trash, causing a release to the environment. A person conducting abatement or renovation would likely dispose of a large quantity of contaminated vermiculite insulation in a manner that would result in an environmental release and exposure to amphibole asbestos fibers. Just as asbestos fibers are tracked into homes, they are also likely to be tracked out of homes, into the environment.

3) Multiple exposure pathways: In addition to adverse effects from exposure to asbestos among

workers and residents in Libby, there has also been a clear pathology associated with secondary exposures. The medical screening conducted by ATSDR during the Summer of 2000 documents an elevated rate of occurrence of lung abnormalities among family members of vermiculite workers. Likewise, the ATSDR screening also found elevated rates of lung abnormalities among people with non-occupational contact with asbestos contamination.

Based on this information and the Libby Administrative Record, EPA has made the following general conclusions regarding asbestos exposure in Libby:

- Whenever materials associated with Libby vermiculite are found in bulk, they will most likely be contaminated with amphibole asbestos;
- The amphibole asbestos found in the Libby vermiculite is highly toxic;
- The amphibole asbestos associated with the Libby vermiculite readily produces respirable fibers when disturbed;
- When people may conduct routine activities in or around the amphibole asbestos there is a high probability for exposure to asbestos at levels that present an unacceptable risk to public health; and,
- As the number of exposure routes increase, so does the risk of developing lung abnormalities and further progressing to symptomatic asbestos-related disease.

EPA and ATSDR investigations show that many residents in the Libby Valley have been and are being exposed to amphibole asbestos fibers through multiple exposure pathways. The August 23, 2001 ATSDR Report indicates that more than 90% of the participants in the medical screening reported 2 or more exposure pathways, while 40% reported six or more pathways.

The ATSDR report also notes that there was an increase in the rate of occurrence of pleural abnormalities, directly linked to a reported increase in exposure pathways. For example, while only 5% of the screening participants who reported no known exposure pathway (other than living in Libby Valley) had observed pleural abnormalities, 24% of the participants who had 6 or more exposure pathways had pleural abnormalities.

4) Specific Exposure Pathways: EPA detected amphibole asbestos in 339 out of 1164 (29%) of the soil and soil-like media samples from Commercial/Residential Yards in the Libby Valley, with 3.4% of the samples at levels greater than 1%. EPA sampled 263 properties, and detected asbestos at 162 of them (62%). Asbestos concentrations exceeded 1% at 21 properties (7.9%).

EPA has found wastes piles of bulk vermiculite ore on residential properties. Ten out of 12 samples (83%) taken from these piles had levels from 1% to 10% amphibole asbestos. On two additional properties the Agency found that residents used tremolite rocks as a decorative border. In general, EPA has found that yard contamination appears to be associated with the presence of vermiculite ores or mining/processing wastes. The contamination is usually confined to discrete areas of the property where these materials were placed, such as a garden or driveway.

EPA has collected settled dust samples from the interiors of buildings at 111 properties, of which 28 (25.2%) had detectable levels of amphibole asbestos. Overall, 12.7% of the dust samples showed detectable levels of amphibole asbestos fibers. Asbestos contamination in settled dust may be attributed to multiple sources, including former vermiculite workers, proximity to processing plants, presence of vermiculite insulation, condition of the building, past renovation work, contamination of surrounding property, and secondary contact and track-in contamination.

During the Phase II Sampling Investigation, the EPA collected air samples from personnel breathing zones and stationary locations during routine household activities (no active cleaning events) and during active cleaning (i.e., vacuuming or dusting). The data indicates that higher levels of amphibole asbestos in settled dust are related to higher airborne concentrations during household activities.

### **B. Threats to the Environment**

The primary threat identified is inhalation exposure of human populations to Libby amphibole, with only secondary concerns for exposure to domestic or feral animals. The Action Memorandum dated May 23, 2000, contains additional discussion about potential threats to the environment.

### **C. Statutory and Regulatory Authorities**

The following is a discussion on the factors used to determine the need for a Removal Action found in the National Contingency Plan at 40 CFR 300.415(b) (2) that relate to the conditions now found in Libby, Montana. The evaluation demonstrates that the conditions at the Site may present an imminent and substantial threat to human health and the environment and meet the criteria for initiating a Removal Action under Section 300.415(b) of the NCP.

1. 300.415(b)(2)(i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances: Amphibole asbestos contamination is found in vermiculite ores and mining/processing wastes throughout Libby, and in settled dust and vermiculite sources in homes and businesses. Site-specific data indicates that exposures to Libby amphibole through a number of sources and environmental media are presently occurring at levels exceeding those commonly accepted for protection of human health.

2. 300.415(b)(2)(v) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released: The climate of the area is characterized by harsh winters and hot summers, with frequent atmospheric inversions, trapping particulate matter and airborne fibers in the Libby Valley, thus aggravating exposures.

3. 300.415(b)(2)(vii) The availability of other appropriate federal or state mechanisms to respond to the release: No other Local, State, or Federal agency is in the position or has the

resources to independently implement an effective response action to address the on-going threats presented at the site. EPA is coordinating its actions with State and Local authorities.

4. 300.415(b)(2)(viii) Other situations or factors that may pose threats to public health or welfare of the United States or the environment: EPA and ATSDR have documented that occupational, secondary, and environmental exposures of the public to a hazardous substance have resulted in broad public health impacts in Libby, Montana. The full medical impact of this Site will likely never be known. Hundreds of asbestos-related deaths have been recorded in Libby over the last two decades. There are currently hundreds more who suffer from asbestos-related illnesses. The ATSDR medical screening indicates that approximately 1,000 people have asbestos-related scarring in their lungs, or the pleural lining of their lungs. People with this type of scarring are at a much higher risk for developing lung cancer, mesothelioma, and/or fibrosis (McMillan et al., 1982; Erlich et al., 1992; Sheperd et al., 1997; Cookson et al., 1986; Viallat et al., 1983). The significant medical impact of asbestos exposure in Libby dictates the need for an expedient and thorough response.

Libby vermiculite was given away informally at processing facilities and not inspected, packaged, labeled, warranted, regulated or sold as a commercial product would be. EPA believes that under these unique circumstances the vermiculite to be removed from residence and businesses does not constitute a product under CERCLA §104(a)(3).

#### **D. Cumulative Contributing Factors at Libby**

The volume, nature and concentration of amphibole asbestos in Libby are unique. The Libby mine operated for nearly 80 years. During this time it is estimated that the mine produced up to 80% of the world supply of vermiculite ore. There is no other known ore deposit of this size in the world. In addition, EPA sample data taken in 2001 confirm that amphibole asbestos volume and contamination levels in the Libby vermiculite ore body are significantly greater than those found in vermiculite ore deposits in South Carolina and Virginia.

The distribution and extent of contamination in Libby are also unique. Massive historical and ongoing asbestos releases have left contamination throughout the Libby area. The processing facilities were very close to the center of town, contaminating many commercial and residential properties. Isolating a single source for specific contamination and exposure scenarios is difficult, if at all possible.

EPA has identified and evaluated 240 vermiculite processors in the US, and found 22 processors with asbestos contamination at levels of concern. The largest of these processors handled approximately 530,000 tons of Libby vermiculite ore from the 1960s to 1990. In comparison, EPA estimates that the total volume of material which came from Libby at 6.5 million tons from the 1960s to 1990. Also, the Libby plants milled, screened and "concentrated" all of this ore, prior to shipping. Therefore, a portion of the asbestos from the mine's total output remained in Libby, via processes which were not used at the contaminated processor plants.

No other site is known to have the unprecedented rates of asbestos-related health impacts found in Libby. Residents exhibit evidence of a high asbestos body burden, and exposures to additional asbestos via multiple pathways. These factors make Libby residents more susceptible to adverse health effects from future exposures. The Libby population also has a very high percentage of smokers and a high average observed body-mass index. These additional factors amplify asbestos-related health impacts.

The socioeconomic status and isolation of Libby further contribute to health issues. Homes tend to be old, in poor repair, and require frequent maintenance or renovation. EPA has documented ongoing releases of contaminated insulation from ceilings and walls inside Libby homes. Residents are likely to attempt unskilled asbestos abatement, home repair, or renovations. This greatly increases the risk of release and exposure to asbestos.

Libby geography compounds exposures and respiratory health issues. The enclosed valley and frequent atmospheric inversions have caused the Agency to designate Libby as a non-attainment area for airborne particulates. Many residents heat their homes with wood fires, further compounding poor air quality in the Libby Valley.

The Libby Asbestos Site is the top priority hazardous waste clean-up site for the State of Montana. The governor has asked that EPA place Libby on the National Priorities List (NPL), using the State's one-time, top priority designation. EPA proposed the site to the NPL on February 26, 2002.

#### **IV. ENDANGERMENT DETERMINATION**

The actual or threatened releases of asbestos from this Site, if not addressed by implementing the response action selected in this Action Memorandum, and those begun earlier (See Action Memorandum dated May 23, 2000), may present an imminent and substantial endangerment to public health, welfare, or the environment.

#### **V. EXEMPTION FROM STATUTORY LIMITS**

The Action Memorandum dated May 23, 2000, provided the documentation required to meet the NCP section 300.415(b)(2) criteria for a removal and the CERCLA section 104(c) emergency exemption from the \$2 million and one year limits on Removal Response Actions. Conditions at the Site continue to warrant this exemption. This Action Memorandum Amendment requests a ceiling increase under the already granted exemption beyond the \$6 million response decision making authority delegated to the Region. This ceiling increase is necessary to complete the Removal Actions authorized by the two previous Action Memoranda (dated May 23, 2000, and August 13, 2001), and the additional Removal Actions as described in

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this Amendment.

**Emergency Exemption:** Current conditions at the Libby Asbestos Site meet the criteria set forth in CERCLA §104(c)(1)(C) [40 CFR 300.415 (b)(5)(ii) of the NCP]; present an immediate threat to public health or welfare or the environment; continued response actions are immediately required to prevent, limit, or mitigate an emergency; and such assistance will not otherwise be provided on a timely basis. If Removal Actions are not initiated or continued, people will be exposed to unsafe levels of amphibole asbestos at all the locations discussed in this Action Memorandum .

**Consistency Exemption:** Since the commencement of removal actions at the Libby Asbestos Site, EPA has proposed the Site to the National Priorities List. Continued response actions are appropriate and consistent with the remedial actions to be taken. Conditions at the Site meet the CERCLA section 104(c) consistency exemption from the 12-month limitation.

Removal Action expenditures at the Libby Asbestos Site will be tracked cumulatively against a (single) total Site ceiling. Any subsequent locations within the Site where actions are deemed immediately necessary as of the result of the on-going investigations in Libby will be documented appropriately and added to the Administrative Record. These actions will likewise be covered by the already established emergency, and tracked in a cumulative fashion.

## **VI. PROPOSED ACTIONS AND ESTIMATED COSTS**

### **A. Proposed Actions**

#### **1. Proposed action description**

EPA will continue and/or initiate actions to mitigate the threat to the public health and welfare or the environment posed by the amphibole asbestos present at a number of locations where vermiculite ores and mining wastes have come to be located. Removal of amphibole asbestos associated with vermiculite ores and mining/processing wastes in outdoor settings will be done by either mechanical excavation or the use of a vacuum truck when possible. Appropriate site controls and decontamination facilities will be used as needed.

In addition, EPA will remove vermiculite sources and amphibole asbestos contaminated dust from targeted homes and businesses within the Libby Valley, tailoring the cleanup based on the condition of the buildings. Although there will be variation among individual homes and buildings, the basic approach to removal of vermiculite and amphibole asbestos contaminated dust for a property will be as follows:

- Establishment of asbestos controls including physical barriers, negative air, decontamination/entry/exit corridor.
- Bulk removal of asbestos contaminated insulation in targeted homes and businesses.

- Removal/disposal of carpets, drapes and upholstery (if contaminated).
- HEPA vacuuming the interior of the home.
- Restoration as needed.

EPA will evaluate the feasibility and cost effectiveness of constructing an asbestos disposal cell at the Lincoln County Landfill. This would allow year round operations and accommodate the scope of the individual property clean-ups.

EPA will conduct the work in discrete geographic areas, addressing contiguous properties concurrently, where possible. Work will begin in the downtown Libby area closest to the former Export Plant, working outward through the Site. EPA will give priority to properties with multiple exposure pathways, high amphibole asbestos concentrations, or a current condition or activity (e.g., remodeling) that may produce high airborne asbestos fiber levels.

Finally, EPA will conduct follow-up monitoring to ensure that removal and restoration of buildings in Libby effectively and permanently addresses potential exposure to sources of respirable amphibole asbestos fibers.

## **2. Contribution to remedial performance**

The Site is currently proposed to the National Priorities List (NPL). The OSC and RPM are collaborating on all sampling investigations to ensure that any removal investigation work is consistent with that required by a remedial investigation. The RPM is involved with most Removal Planning (such as evaluating the use of the Lincoln County Landfill) to ensure that clean-up goals and long-term management needs are met. Given this close coordination the current removal actions will be consistent with any remedial cleanup that might be taken.

## **3. Description of alternative technologies**

EPA has not found appropriate alternate remediation technologies given the nature of the amphibole asbestos contamination, the scope of the project, and its time-critical nature. EPA will consider alternate remediation technologies that might enhance response actions, if any are identified in the course of this, or any subsequent removal actions at the Site.

## **4. EE/CA**

This is a Time-Critical Removal Action; thus, an EE/CA is not required.

## **5. Applicable or relevant and appropriate requirements**

See the Federal and State ARARs identified and/or discussed in the attached Action Memorandum (May 23, 2000).



## 6. Project Schedule

Pending approval of this Action Memorandum Amendment, work will begin in Spring 2002. Completing the excavations and restorations already underway will be the first priority. The construction of the infrastructure necessary to support the clean-up of the individual homes in the Libby Valley will be the second. The start of removal of vermiculite ores, mining wastes and other sources from the downtown area should begin in Summer 2002. Work is likely to take two to three construction seasons. A more detailed schedule will be developed upon Headquarters approval of this Action Memorandum Amendment.

## 7. Estimated Costs

The costs estimates presented in this section will be presented in two parts: 1) a proposed overall Site ceiling incorporating the current Site ceiling and costs to date by removal area, the proposed increases due to the additional number of properties where vermiculite ores and mining/processing wastes have been found, closeout of on-going projects and a planning figure for the construction of an asbestos landfill cell. 2) A breakdown of the estimated cost per property for vermiculite removal.

**Table 1, Proposed Site Ceiling by Project Area**

	Current Ceiling (Excluding Memo 8/13/00)	Proposed Ceiling Increase	Proposed Ceiling (Total Project Cost)
<b>1. Export Plant (PRP - Lead)</b>	\$1,525,000	\$ 100,000	\$ 1,625,000
<b>2. Screening Plant (Fund - Lead)</b>			
-Removal Work	\$7,605,000	\$ 1,000,000	\$ 8,600,000
- Settlement (Parker)	1,500,000	-0-	1,500,000
<b>3. KDC Properties (Screening Plant)</b>	\$1,500,000	\$ 1,500,000	\$ 3,000,000
<b>4. School Tracks and other Affected Areas</b>	\$2,500,000	\$ 1,000,000	\$ 3,500,000
<b>5. Residential Areas</b>	\$ 600,000	\$ 6,200,000	\$ 6,800,000
<b>6. Rainy Road</b>	\$1,500,000	-0-	\$ 1,500,000
<b>7. Landfill Cell Design and Construction</b>	-0-	\$ 3,000,000	\$ 3,000,000
<b>8. Interior Removals and Clean-up</b>	-0-	\$12,000,000	\$12,000,000
<b>9. Removal Sampling Support and Overhead</b>	-0-	\$ 4,000,000	\$ 4,000,000

<b>Subtotal Extramural</b>	<b>\$16,930,000</b>	<b>\$28,800,000</b>	<b>\$45,525,000</b>
<b>Contingency</b>	<b>\$ 3,386,000</b>	<b>\$ 5,509,000</b>	<b>\$ 9,100,000</b>
<b>Total Extramural Costs</b>	<b>\$20,316,000</b>	<b>\$34,309,000</b>	<b>\$54,625,000</b>
<b>1. EPA Direct Costs</b>	<b>\$ 210,000</b>	<b>\$ 100,000</b>	<b>\$ 310,000</b>
<b>2. EPA Indirect Costs</b>	<b>\$ 400,000</b>	<b>\$ 250,000</b>	<b>\$ 650,000</b>
<b>Total Intramural Costs</b>	<b>\$ 610,000</b>	<b>\$ 350,000</b>	<b>\$ 960,000</b>
	<b>\$20,926,000</b>	<b>\$34,659,000</b>	<b>\$55,585,000</b>

Table 2, Targeted Home, Business Interior Costs

Residential				
		Removal, HEPA/Wet Wipe Interior	\$ 8,000	
		Restoration	\$ 3,000	
		<b>Subtotal</b>	<b>\$ 11,000</b>	
	<b>800 @ \$11,000</b>			<b>\$8,800,000</b>
Commercial				
		Removal, HEPA/Wet Wipe Interior	\$18,000	
		Restoration	\$ 5,000	
		<b>Subtotal</b>	<b>\$23,000</b>	
	<b>100 @ \$23,000</b>			<b>\$2,300,000</b>
Public Buildings				
		Interior Cleaning	\$42,000	
		Restoration	\$14,000	

		<b>Subtotal</b>	\$56,000	
	15@ \$56,000			\$ 840,000
<b>Total</b>				<b>\$11,940,000</b>

There are other EPA Region VIII expenditures at the Libby Asbestos Site that are tracked separately from the above mentioned Removal Ceiling. These are the costs associated with the Removal Site Investigation (a.k.a.- Phase I Investigation), costs incurred by the Region to support the ATSDR Medical Screening, the Performance Evaluation Study, the funds given to USGS for technical support, the Exposure Scenario Investigation (a.k.a.-Phase II Investigation), funds provided to develop a site specific Risk Assessment, and funds used to help update the Superfund Program's Generic Asbestos Risk Assessment. For clarification purposes only, below is an estimate of the project budget for each of these items:

<b>Task</b>	<b>Regional Project Budget (FY00/01)</b>	<b>Regional Project Budget (FY02)</b>
Phase I Sampling Investigation	\$ 4,500,000	\$2,000,000
Medical Screening Support	\$ 500,000	-0-
PE Study	\$ 700,000	\$ 50,000
USGS	\$ 1,000,000	\$ 50,000
Phase II Sampling Investigation	\$ 1,000,000	\$ 100,000
Site Specific Risk Assessment	\$ 300,000	\$ 200,000
Generic Risk Assessment	\$ 500,000	\$ 20,000
<b>TOTAL</b>	<b>\$ 8,500,000</b>	<b>\$2,420,000</b>

## **VII. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN**

Delayed action will result in continued public exposure to unsafe amounts of amphibole asbestos. This will increase the risk to public health, and continue to burden an already heavily impacted community.

## **VIII. OUTSTANDING POLICY ISSUES**

The Removal Actions described as part of this Action Memorandum are consistent with EPA policy. These actions are based upon the unique circumstances in Libby, Montana. This includes not only the level of cumulative exposure and multiple pathways, but also the highly unusual facts indicating that homes in Libby contain insulation that consists of the asbestos-containing vermiculite mined at Libby that was not inspected, packaged, labeled, warranted, regulated or sold as a commercial product.

## IX. ENFORCEMENT

Attachment 5 is a confidential summary of the Enforcement Actions.

## X. RECOMMENDATION

This decision document represents the selected Removal Action for the removal of asbestos sources from targeted homes, businesses, and public buildings in the Libby Valley, which is within the Libby Asbestos Site, located in Libby, Lincoln County, Montana. The proposed Removal Actions have been developed in accordance with CERCLA as amended, and consistent with the NCP. This decision is based on the Administrative Record for the Site.

Conditions at the Site meet the NCP [40 CFR § 300.415(b)] criteria for a Removal Action, and the NCP [40 CFR §300.415(b)(5)(ii)] criteria for an exemption from the statutory limits. I recommend your approval of the proposed Removal Action. The costs include a ceiling increase of \$34,659,000, with a total project ceiling of \$55,635,000.

Approve: Marianne C. Horinko Date: 5/9/02  
 Marianne Lamont Horinko  
 Assistant Administrator  
 Office of Solid Waste and Emergency Response

Disapprove: \_\_\_\_\_ Date: \_\_\_\_\_  
 Marianne Lamont Horinko  
 Assistant Administrator  
 Office of Solid Waste and Emergency Response

**Figures:**

Figure 1	Regional Map
Figure 2	Site Map

**Attachments:**

- Attachment 1 Action Memorandum, May 23, 2000
- Attachment 2 Action Memorandum Amendment, August 17, 2001
- Attachment 3 ATSDR Medical Testing of Individuals Potentially Exposed to Asbestoform Minerals Associated With Vermiculite in Libby, Montana (Health Screening Study), August 23, 2001
- Attachment 4 ATSDR Health Consultation (Mortality Study), December 12, 2000
- Attachment 5 Enforcement Memorandum

**SUPPLEMENTAL DOCUMENTS**

Support/reference documents which may be helpful to the reader and/or have been cited in the report may be found in the Administrative Record File at the Superfund Records Center for Region VIII EPA, 999 18th Street, Denver, Colorado 80202.